

Turek et al.

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## (54) MOBILE AGENTS FOR FAULT DIAGNOSIS AND CORRECTION IN A DISTRIBUTED COMPUTER ENVIRONMENT

(75) Inventors: John J. E. Turek, South Nyack, NY (US); Brian Jay Vetter, Austin, TX (US)

(73) Assignee: International Business Machines Corporation, Armonk, NY (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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(38) Field of Search 709/202, 223, 709/224, 239, 240, 206, 203; 370/241, 242; 714/4, 25, 46

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Primary Examiner—Mark H. Rinehart

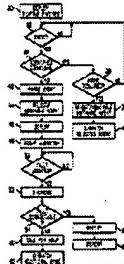
Assistant Examiner—Marc D. Thompson

(74) Attorney, Agent, or Firm—Duke W. Yee; Jeffery S. LaBaw; Stephen R. Lee

## (57) ABSTRACT

A large distributed enterprise includes computing resources that are organized into one or more managed regions, each region being managed by a management server servicing one or more gateway machines, with each gateway machine servicing a plurality of endpoint machines. A method of diagnosing a fault in such an environment begins by deploying a management infrastructure throughout the computer network, the management infrastructure including a runtime environment at each of the endpoint machines. In response to occurrence of the fault, a software agent is selected, the software agent being executable by the runtime environment at an endpoint machine. The selected software agent is then deployed into the computer network to diagnosis the fault. If the location of the fault is indeterminate, the software agent migrates to the location by gathering information about the fault as it traverses the network.

30 Claims, 5 Drawing Sheets



Document ID	Pag	Current	Current	S	PT
1 US 6738933	72	714/47	702/186	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2 US 6724736	19	370/286		<input checked="" type="checkbox"/>	<input type="checkbox"/>
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1	<input type="checkbox"/>	US 6711615 B2	20040323	19	Network surveillance	709/224	713/201		Porras; Phillip Andrew et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	US 6708212 B2	20040316	16	Network surveillance	709/224	713/201		Porras; Phillip Andrew et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	US 6484203 B1	20021119	15	Hierarchical event monitoring and analysis	709/224	713/201		Porras; Phillip Andrew et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Scholl et al.

[45] Date of Patent: Apr. 21, 1998

## [54] NETWORK MANAGEMENT GATEWAY

[75] Inventors: Thomas H. Scholl; William E. Wlkorvsky, both of Gaithersburg, Md.  
 [73] Assignee: Telenet Networks, Inc., Germantown, Md.

[21] Appl. No.: 444,483

[22] Filed: May 19, 1998

[51] Int. Cl. 6 G06F 13/00  
 [52] U.S. Cl. 395/200.3; 395/200.57  
 [56] Field of Search 395/200.01, 200.09,  
 395/200.11, 200.12, 370; 370/85.13

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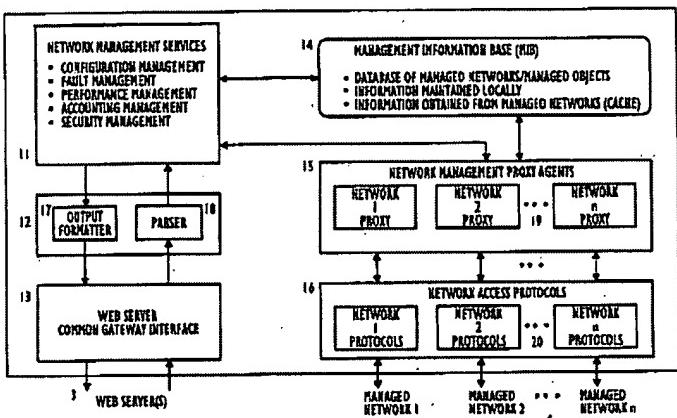
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Primary Examiner—Ayaz R. Sheikh  
Attorney, Agent, or Firm—Stephen C. Glazier

## [57] ABSTRACT

The present invention provides network management of a network or multiple networks, using a Web client, and including multimedia and hypertext capability. The present invention provides a unified, remote, graphical, transparent interface for Web users, working at a Web client to a variety of managed networks. The present invention receives requests from a Web client forwarded by a Web server and interacts with the managed networks and their associated objects to obtain information. The present invention then converts this information in real time to hypertext document format in HTTP and HTML, and transmits this information to the Web client via the Web server appearing to the client as information in a Web file. This permits a Web user to manage multiple networks and access multiple networks via a single Web client, thus providing a unification of the management interface for dissimilar managed networks, and devices.

18 Claims, 6 Drawing Sheets



Document ID	Pag	Current	Current	S	PT
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2 US 6704873	273	713/201	709/223	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3 US 6633878	270	707/100	707/11	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 US 6609128	268	707/10	707/200	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 US 6601233	278	717/102	717/100	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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7 US 6373817	32	370/217	370/215	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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